

Jacquin. But the latter name, although well known to the Vienna botanists, having been since applied by Pohl to a South American genus, it has become necessary to recur to that originally given, which may also possibly be set aside if (as there is reason to suspect) the genus should prove to be identical with the *Rhincoglossum* of Dr. Blume. "With regard to the genus itself," Mr. Brown observes, "it may be doubted whether *Loxotis* and *Glossanthus* ought to be generically distinguished merely or chiefly on account of the difference in the number of their antheriferous stamina, especially as they entirely agree in habit, in which there is something peculiar. It is not a little remarkable, that in some of the more minute and less important differences between them, the intermediate structure or connecting link should be found in a species sent by Dr. Schiede from Mexico (*Glossanthus Mexicana*, Br. ined.) and that this should be the only plant belonging to *Cyrtandraceæ* hitherto observed in any part of America."

The twenty-fifth plate, the last of the present part, represents another plant of the same tribe, *Loxonia acuminata*, the letter-press relating to which is postponed to the succeeding part.

Under the head of each plant, Dr. Horsfield has furnished valuable information as to its habit, growth and uses; the precise localities in which it was found by him, particularly noting the height above the level of the ocean; its native name, and such other particulars as his long residence in Java enabled him to collect.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

March 27th, 1838.—William Yarrell, Esq., in the Chair.

A Dugong preserved in spirit having been presented to the Museum by Alexander John Kerr, Esq., of Penang, Mr. Owen communicated to the meeting some notes descriptive of the principal *viscera* in this remarkable aquatic mammal, and a statement of the relative proportions exhibited by its several parts, in comparison with the dimensions of a Dugong published by Sir Stamford Raffles in the Phil. Trans., 1820, and of two other specimens which Mr. Owen had on previous occasions examined in the Society's collection. From these notes, as given in No. 63 of the Society's 'Proceedings,' the following are extracts.

Mr. Owen remarks, that "The external form of the Dugong is not so well calculated for moving rapidly through the water as that

of the Dolphin and other carnivorous *Cetacea*, which subsist by a perpetual pursuit of living animals. In these the snout is conical, and peculiarly elongated, and in some, as the *Delphinus Gangeticus*, the jaws are produced to an extreme length, so as to give them every advantage in seizing their swift and slippery prey; whilst, in the herbivorous Dugong, the snout is as remarkable for its obtuse, truncate character;—a form, however, which is equally advantageous to it, and well adapted to its habits of browsing upon the *algæ* and *fuci* which grow upon the submarine rocks of the Indian seas.

“As, from the fixed nature of the Dugong’s food, the motions of the animal during the time of feeding must relate more immediately to the necessity of coming to the surface to respire, its tail, the principal locomotive organ of ascent and descent, is proportionally greater than in the true *Cetacea*, its breadth being rather more than one-third the length of the whole body.

“But the most important external differences are seen in the presence of the *membrana nictitans*, in the anterior position of the nostrils, and in the situation of the *mammæ*, which are pectoral, or rather axillary, being situated just behind the roots of the flippers; in the female specimen examined their base was about the size of a shilling, and they projected about half an inch from the surface.

“A considerable ridge extends along the middle of the upper surface of the posterior part of the back, which is continued upon and terminates in the tail.

“The mouth and tongue corresponded with the descriptions already published of these remarkable structures. The opening of the *larynx* is chiefly defended, during the submarine mastication of the vegetable matters constituting the food of the Dugong, by the extreme contraction of the faucial aperture, which resembles that of the *Capbara*. It is not traversed by a pyramidal *larynx*, as in the true *Cetacea*.

“The stomach of this singular animal presents, as Sir Everard Home has justly observed, some of the peculiarities met with in the Whale tribe, the *Peccari* and *Hippopotamus*, and the Beaver: like the first, it is divided into distinct compartments; like the second and third, it has pouches superadded to and communicating with it; and, like the last, it is provided with a remarkable glandular apparatus near the *cardia*.

“To the left of the *cardia* there projects into the stomach a rounded mammilloid eminence, whose base is 2 inches in diameter, and whose *apex* presents an oblique crescentic orifice about 3 lines in diameter; on drawing aside the margins of this orifice, I found that, instead of its

being the outlet of a simple mass of follicular glands, it led to a wide, flattened, winding *sinus*, and that its circumference was formed by the termination of a membrane spirally disposed in about eight or ten turns, and increasing in breadth at each gyration, having both surfaces covered with the orifices of numerous glandular follicles, and the interspaces filled with a cream-like secretion. This structure, which adds another peculiarity to the stomach of the Dugong, and one met with in the *cæcum* only in a few other *Mammalia*, viz. that of having its blind end occupied by a spiral membrane, I have found in all the specimens dissected at the Society; and in each case the gland was infested by *Ascarides*, hereafter to be described, which left impressions upon the spiral membrane.

“The orifice leading to the pyloric cavity of the stomach is provided with a circular and valvular production of the inner membrane of the stomach. Immediately beyond this valve are the orifices of the two cæcal appendages, situated $1\frac{1}{2}$ inch apart at the upper and rather towards the posterior side of the cavity; these orifices were about an inch in diameter, but the inferior orifice was the larger of the two. Small quantities of comminuted sea weeds were found in both these receptacles.

“From the complexity of the stomach, the great extent of the alimentary canal, its vast muscular power, and glandular appendages, the digestive functions must be extremely vigorous in this animal. The vigour of the digestive functions obviously relates, in the herbivorous section of *Cetacea*, to the low organized indigestible character of their nutriment; but the complicated stomach and long intestinal canal of the carnivorous *Cetacea* must have other relations than to the kind of food. These modifications of the digestive system, for example, cannot be so explained in the *Grampus*, which preys on the highly organized *Mammalia* of its own class. It is not to the nature of the food, but to the quantity of nutriment that is required to be obtained from it, that I conceive the peculiarities of the digestive system in the carnivorous *Cetacea* to relate. In no other *Carnivora* is the same quantity of blood, the same mass of fat to be eliminated from the raw material of the food: the digestive system is, therefore, perfected in these warm-blooded carnivorous *Mammalia* to meet the contingencies of their aquatic life.

“The *omentum* is continued from the great curvature both of the cardiac and pyloric divisions of the stomach; though short, it is much more distinctly developed than in the carnivorous *Cetacea*; it contains no adipose matter.”

Having described various other particulars connected with the *chy-*

lopoietic viscera, and the individual differences which they presented in the three specimens dissected, Mr. Owen proceeded to observe as follows :—

“ The views taken by Cuvier of the natural affinities of the Dugong and other herbivorous *Cetacea*, as expressed in his latest classification, in which they form part of the same order as the carnivorous *Cetacea*, are undoubtedly questionable, and have been dissented from by De Blainville and other eminent authorities in zoology. If, indeed, the object of every good classification be, what Cuvier states it to be, to enable the naturalist to express in general propositions structures and attributes common to each given group, the conjunction of the Dugong with the Dolphin fails in this respect in regard to almost all the important points of internal organization.

“ In proceeding with our investigation of the abdominal *viscera*, we find, with respect to the biliary organs, that the Dugong deviates in a marked degree from the ordinary *Cetacea* in the presence of a well-developed gall-bladder. Daubenton found a gall-bladder in the Manatee; but the presence of this organ is not constant in the herbivorous *Cetacea*, for in the Northern Manatee (*Stellerus borealis*, Cuv.), according to Steller*, the gall-bladder is wanting, and its absence seems to be compensated by the enormous width of the *ductus communis choledochus*, which would admit the five fingers united.

“ All the three specimens presented the same remarkable extent of separation of the two ventricles of the heart which Raffles and Home have described in the individuals dissected by them, and which Rüppell † observed in the Dugong of the Red Sea (*Halicore Tabernaculi*, R.). This condition of the heart was first noticed by Daubenton in the *fœtus* of the Manatee; and is also described by the unfortunate Steller in the genus worthily consecrated to his name, in which, however, the apical cleft of the heart extended upwards only one third of the way towards the base. In the Dugong it reaches half-way towards the base. The carnivorous *Cetacea* do not participate with the herbivorous section in this interesting structure.

“ In the smoothness and evenness of their exterior, and their general form, the auricles of the Dugong resemble those of the Turtle (*Chelone*): the *appendix* can hardly be said to exist in either. There is one superior *cava* only, not two as in the elephant.

“ The peculiar form, structure, and position of the lungs have been so accurately described and figured by Raffles, Home, and Rüppell,

* See *Novi Commentarii Acad. Scient. Petrop. t. 4. 1751.*

† *Beschreibung des im Rothen Meere vorkommenden Dugong.* 4to. Frankfurt, 1833, p. 106.

that I have only to observe the close agreement with these accounts which the structure of the parts presented in the three Dugongs dissected by me; Daubenton* and Humboldt† describe and figure a precisely similar condition of the respiratory apparatus in the Manatee. Steller describes the same extension of the lungs along the dorsal aspect in the *Stellerus*, which he aptly compares to the position of the lungs in the bird, but without their fixation to the *parietes* of the chest, so characteristic of that class. The Chelonian reptiles, perhaps, offer a closer resemblance‡ to the herbivorous *Cetacea* in this respect; and it is worthy of remark that the air-cells of the lungs are larger in the Dugong than in any other Mammals. In the carnivorous *Cetacea* the air-cells are remarkably minute, and the lungs more compactly shaped and lodged in a shorter *thorax*.

“ There are but three true tracheal rings anterior to the bifurcation of the air-tube: the first of these is remarkable for its superior size, which forms an intermediate transition between the cricoid and the second tracheal ring. The tube is somewhat flattened from before backwards; its circumference is 5 inches; its antero-posterior diameter 1 inch. In the *Balenidæ* the tracheal rings are deficient at the anterior part of their circumference. The spiral disposition of the cartilages of the air-tubes, of which Home has given a figure, in the Dugong, is described with more detail by Steller in the Northern Manatee. It is a structure which best facilitates the lengthening and shortening of the lungs, whose change of bulk in respiration, owing to their peculiar form and position, probably takes place chiefly in that direction.

“ Amongst the true *Cetacea* we have observed that it is those which subsist on the lowest organized animal substance, as the *Balenidæ*, which approach the nearest to the herbivorous species, in having the additional complexity of the *cæcum cæli*; and it is interesting to find that the same affinity is manifested in the structure of the *larynx*. The *epiglottis* and *arytenoid cartilages*, for example, are relatively shorter in the *Balenoptera* than in *Delphinus*; and, as Mr. Hunter has observed, they are connected together by the membranes of the *larynx* only at their base; and not wrapped together or surrounded by that membrane as far as their *apices*, as in the Dolphins. In the *Balenoptera* also, the *apices* of these cartilages are not expanded, as

* Buffon, vol. xiii.

† Wiegmann's *Archiv für Naturgeschichte*, 1838, pl. ii. fig. 5.

‡ This resemblance is further exemplified in the shortness of the *trachea*, the completeness of its cartilaginous rings, the length of the bronchial tubes, and the extension of their cartilaginous structure far into the substance of the lungs in the Dugong.

in the Dolphins, but diminish to an obtuse extremity. These points of resemblance to the condition of the *larynx* in the Dugong and Manatee are carried still further in the Mysticete Whale, at least in the *fœtus* dissected by me, and in which both the *epiglottis* and *arytenoid cartilages* were relatively much shorter, and the thyroid cartilage larger and more convex than in the Piked Whale (*Balænoptera*). The *thyroid cartilage* is, however, a single piece in both genera of *Balænidæ*, though deeply notched above and below; and the *larynx* presents several interesting individual peculiarities, which, however, the minute and accurate descriptions and illustrations of this organ in both the *Balænoptera* and *Balæna*, published by Prof. G. Sandifort*, preclude the necessity of further dwelling upon.

“The generative organs being those which are most remotely related to the habits and food of an animal, I have always regarded as affording very clear indications of its true affinities. We are the least likely, in the modifications of these organs, to mistake a merely *adaptive* for an *essential* character. The true *Cetacea*, as is well known, have no trace of *vesiculæ seminales*; but I found these bags present and of large size in the male specimen of our Dugongs.

“The bones are chiefly remarkable, as in the Manatee, for their dense texture, and the non-development of medullary cavities in them: this reptile-like condition of the skeleton is further exemplified in the loose connexion of the bones of the head. The bones are not loaded with oil, as in the *Cetacea*. All the specimens presented 7 cervical and 19 costal *vertebræ*, corresponding to the 19 pairs of ribs; but the number of the remaining *vertebræ* exceeded that ascribed to the Dugong by Home and Cuvier, there being at least 30, making in all 55. The affinity of the Dugong to the *Pachydermata* is thus again illustrated by the great number of the ribs. The lower jaw is articulated to the *cranium* by a true synovial capsule, reflected over cartilaginous surfaces, and not, as in the carnivorous *Cetacea*, by a coarse and oily ligamentous substance.

“It has been suggested that the use of the projecting tusks in the Dugong is to detach *fuci* from the rocks to which they adhere: one can hardly, however, assign any important function in relation to nutrition to parts which are limited to the male sex; but it must be remembered that the function was assigned by a physiologist who supposed that the tusks in question were specific and not sexual characters, and that the imperfect tusks, which are peculiar to the female, were the predecessors of the projecting tusks, and, in fact,

* *Nieuwe Verhandelingen der Koninklik, Niederlandische Instituut*, Deel. iii. p. 224, pl. I.—V.

deciduous teeth. This opinion of Sir Everard Home was first called in question by Dr. Knox*, who, having detected the supposed deciduous tusks in the head of a nearly full-grown Dugong, rejected with great justice the opinion of Home, that they are deciduous teeth; and he truly observes, that no evidence had been given to prove the existence of deciduous tusks at all in the Dugong†.

“ I need hardly observe that the tusks of the Dugong, being implanted in the intermaxillary bones, are to be regarded, like the tusks of the Elephant, as incisors. Now both sexes of the Dugong, as of the Elephant, do, in fact, possess deciduous or milk-tusks, but they are much smaller than the female permanent tusks or supposed deciduous teeth of Home.

“ In the skull of a male Dugong which had *molars* $\frac{3-3}{2-3}$, the sockets of the deciduous incisors were obliterated, and the points of the permanent ones projected from their sockets. In only one out of seven *crania* of the Dugong which I have examined, have I found incisors in the lower jaw; they were two in number, one in the corresponding socket of each *ramus*, which sockets were much deeper than the rest. These teeth were smaller and more bent than the deciduous incisors of the upper jaw. They are obviously analogous to the rudimental teeth which have been described in the jaws of the foetal Whale.

“ The short and thick neck, fin-like fore-legs, want of hind-legs, caudal tegumentary fin, smooth, naked, and almost hairless integument, are all modifications of external form, by which the Dugongs and Manatees are adapted to play their part in the waters: but the *kind of part* which they are to play in that element depends on organic characters which mainly if not exclusively reveal their true affinities. Now we have seen that the whole of the internal structure in the herbivorous *Cetacea* differs as widely from that of the carnivorous *Cetacea*, as do their habits: that the amount of variation is as great as well could be in animals of the same class, existing in the same great deep. The junction of the Dugongs and Manatees with the true Whales cannot therefore be admitted in a distribution of animals according to their organization. With much superficial resemblance they have little real or organic resemblance to the Walrus, which exhibits an extreme modification of the am-

* Edinb. Phil. Trans. xi. p. 389.

† “The milk-tusks of the Dugong have never been seen by any one; that is, I have not heard of the existence of any preparation showing the germs of the milk or permanent teeth, together or in succession.”—*Dr. Knox, loc. cit.* p. 398.

phibious carnivorous type. I conclude, therefore, that the Dugong and its congeners must either form a group apart, or be joined, as in the classification of M. De Blainville, with the Pachyderms, with which the herbivorous *Cetacea* have the nearest affinities, and to which they seem to have been more immediately linked by the now lost genus *Deinotherium*."

Some prepared specimens belonging to the genera *Siphunculus* and *Asterias*, collected by Mr. Harvey upon the Devonshire coast, and presented to the Society, were upon the table, to which Mr. Owen drew the attention of the Meeting. The Chairman read an extract of a letter from the former gentleman, in which he stated that a considerable number of the Red-band Fish (*Cepola rubescens*) had been picked up on the beach near Teignmouth. One of these specimens sent by Mr. Harvey was exhibited by Mr. Yarrell, who observed that these fish are rarely captured, owing to their keeping very near the bottom, and their shape allowing them to pass through the meshes of the fishermen's nets. In severe storms, however, shoals of this *Cepola* are sometimes killed by being driven against the bottom, or dashed against the rocks, and are then thrown on shore dead. Mr. Yarrell remarked that he had heard of two or three instances of this kind recently occurring on the British coast.

MISCELLANEOUS.

THE NEW HOLLAND GERBOA RAT (*HAPALOTIS ALBIPES*, LICHT.) BY
JOHN EDWARD GRAY, F.R.S., &C.

The Trustees of the Museum have recently purchased of Dr. John Lhotsky a perfect specimen of the *Hapalotis albipes*, described by Professor Lichtenstein in 1827, 'Darstellung der Säugethiere,' t. 29, from a specimen sent to Berlin in 1824 by Dr. Sieber; and a second which was sent to Berlin by Dr. Lhotsky was put up for sale there on the 6th of April 1837, and bought by the Royal Museum.

Our specimen differs from that described by Prof. Lichtenstein in having the tail as long as the body, and the tip of it, which was most probably wanting in the Berlin specimen, is covered with long expanding hairs; the upper side of the tail is dark-brown, and the under side and the pencil of long hairs at the tip is white. Dr. Lichtenstein in his description says the tail is only one third the length of the body, but in his figure represents it as half the length of the body and head. The ears of our specimen are covered externally with short appressed hairs, those of the front half being brown, and